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AUTHOR Howard, Marilyn
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ABSTRACT

The Auditory Discrimination in Depth (ADD) program, an oral-motor approach to beginning reading instruction, causes students to become aware of the oral-facial characteristics of phonemes by calling conscious attention to the motor characteristics of each sound. This aspect of phoneme production is connected to visual and auditory cues to provide heightened sensory awareness of number, order, and identity of sounds in a spoken syllable. A study was conducted to examine if exposure to the ADD program in kindergarten would make a difference in students' first grade entry scores as measured by a standardized reading achievement test. Sixty-two kindergarten children in one school tracked consonant and vowel phonemes in syllables by using labels that identified the presence of each phoneme at a pre-grapheme level. Once children were aware of the sequence of phonemes on an auditory, oral-motor level, graphemes were introduced and the tracking of sounds was extended to spelling and reading. Results indicated that children who received ADD training entered first grade with better reading skills, as measured by the Woodcock Reading Mastery Tests, than did students who did not receive the training. (FL)

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Abstract: The Auditory Discrimination in Depth (ADD) Program, an oral-motor approach to beginning reading instruction, was used to train kindergarten children in segmentation and blending skills by a process in which awareness of oral-proprioceptive qualities of phoneme production are associated to auditory and visual properties of speech.

Children tracked consonant and vowel phonemes in syllables by using labels which identified the presence of each phoneme at a pre-grapheme level. Once children were aware of the sequence of phonemes on an auditory, oral-motor level, graphemes were introduced and the tracking of sounds was extended to spelling and reading.

Children who received such training in kindergarten entered first grade with better reading skills, as measured by the Woodcock Reading Mastery Tests, than students who did not have such training. p values exceeded .001 on all subtests except Word Comprehension which had a p value of <.01.

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MARILYN HOWARD
Kindergarten Teacher
Arco Elementary School
Arco, Idaho 83213

Using Oral-Motor Cues to Develop
Phonemic Awareness in Kindergarten.

Available evidence indicates that ability to use the phonetic code is an integral part of learning to read (Perfetti & Beck, 1982; Stanovich, 1982; Evans and Carr, 1985). Dykstra (1979) reviewed more than sixty years of research and concluded that:

> "Early systematic instruction in phonics provides the child with the skills necessary to become an independent reader at an earlier age than is likely if phonics instruction is delayed and less systematic."

The essential features of phonic instruction have been isolated by examining differences between good and poor readers. A review of literature by Perin (1983) indicated in a wide variety of tasks, good readers were superior to poor readers in the ability to isolate and

manipulate phonemes. Research by Bradley and Bryant (1978) revealed that backward readers had difficulty in mentally organizing spoken sounds.

This report discusses the effect on first grade reading entry scores when children were trained in kindergarten to identify phonemes on the basis of their oral-proprioceptive qualities and, subsequently, to add that sensory awareness to auditory and visual cues when identifying the sequence of sounds within a spoken syllable.

Research which supports such a procedure will be discussed followed by a description of its implementation and its effect upon reading scores.

Research

Studies by Perfetti and Goldman (1976), Haddock (1976), and Jorm (1979) indicate that early reading training needs to go beyond phoneme/grapheme association activities to include experiences in manipulating those phonemes within syllables. Lewkowicz (1980) considers the two tasks of phonemic awareness to be phoneme segmentation, separately articulating - isolating- all the sounds of a word in correct order; and blending, or responding to a sequence of isolated speech sounds by recognizing and pronouncing the unit they constitute.

Mann and Liberman (1984) suggest reading nursery rhymes, playing word games such as Pig Latin, and "practice, practice, and more practice" be applied to help students become aware of the phonemic

structure of words. A Russian psychologist, Elkonin, (1973) developed more specific procedures to analyze the sound formation of words. He had students place a colored marker to indicate each phoneme in a spoken syllable. When the student was able to reconstitute the sound formation of the word in this manner, , graphemes were introduced so spelling could be depicted.

Lindamood and Lindamood (1969) developed a teaching program which extends and refines the approach first suggested by Elkonin. Their program, Auditory Discrimination in Depth, causes students to become aware of the oral-facial characteristics of phonemes by calling conscious attention to the motor characteristics of each sound. This "feeling" aspect of phoneme production is connected to visual and auditory cues to provide heightened sensory awareness of number, order, and identity of sounds in a spoken syllable.

The effect of implementing the Lindamood approach as an integral part of general classroom instruction in first grade has been tested by the Arco Elementary School in Arco, Idaho since 1974 (Howard, 1979, 1981). That intervention caused the district's normal average on the reading subtest of the Iowa Tests of Basic Skills to move from the 52nd to the 86th percentile. When compared to a control group, the children trained with the Lindamood program were significantly superior on every subtest of the Woodcock Reading Mastery Tests (WRMT) with statistical values well beyond 1 in 1000.

During the 1983-84 school year the approach was extended to involve the Arco kindergarten. The question under study was, Would teaching the Auditory Discrimination in Depth Program in kindergarten make a difference in first grade entry skills as measured by the subtests of the WRMT?

Method

During 1983-84, all kindergarten students at Arco (n=62) received about ten minutes of daily training in the principles of the Auditory Discrimination in Depth Program (ADD) as outlined in the ADD manuals in addition to their standard kindergarten curriculum.

The ADD Program allows the development of phonemic awareness of syllable and word construction prior to the introduction of graphemes. The students are first asked to cognitively direct their auditory attention to discrimination of environmental sounds. This step quickly gives way to identifying and categorizing speech sounds on the basis of their oral-motor proprioceptive characteristics. The child verbally describes his/her awareness of the articulatory features of each sound's production and , through teacher questioning, is helped to separate the tangential from the germane. Labels, descriptive words which call verbal attention to salient oral-motor actions associated with each sound's production, provide an efficient way to talk and think about the separate phonemes. For example, the bi-labial characteristics of the sounds /p/ and /b/ are noted by

labeling them the "quiet (unvoiced) and noisy (voiced) lip poppers".

Once students have awareness of the oral-motor characterists of two vowels' and several consonants' sounds, and can communicate that awareness by use of labels, they are asked to identify those elements in spoken syllables. By using pictures which illustrate the mouth actions for the categories of phonemes, the child identifies the phonemic units in a syllable and manipulates those units by putting them together in sequences (blending) or noting which ones comprise the spoken syllable (segmenting).

By providing experience first with simple syllables of CV, VC, and CVC composition, and moving later to complex syllables, (CCV, VCC, CCVC, CCVCC) the child receives practice in thinking about the sequential order of more and more complicated patterns.

Because the use of graphemes is not integral to these initial steps, the kindergarten children have extended practice in syllable segmentation and blending without use of an alphabetic system. When students are fluent in identifying the number, order, sameness, and differences of sounds in spoken syllables at a phonemic level, graphemes are introduced . When graphemes are associated with the strongly developed auditory and oral-motor awarenesses, the students are able to use the integrated knowledge from these multi-sensory sources to spell and read in an alphabetic system.

Results

Students who had ADD training in the Arco kindergarten during the 1983-84 school year entered first grade scoring better on every subtest of the Woodcock Reading Mastery Tests, than did Arco students from previous years who did not have ADD training in kindergarten.

An analysis of variance contrasting pretest scores on the WRMT indicated that there was no significant difference between the pretest scores as students entered first grade for any of the six years from 1974 through 1983 when such testing was conducted. However, when the first grade entry scores (Fall, 1984) of students who had ADD training in kindergarten were compared to those of previous years, the difference was significant at $p < .001$, with results favoring the 1984 group.

A t test for independent means comparing raw scores on the Woodcock Reading Mastery Tests for the Fall 1983 and Fall 1984 kindergartens revealed the difference between the Arco students who did not have ADD training in kindergarten (1983) and those who did have ADD training in kindergarten (1984) was significant at the $p<.001$ level of confidence for letter identification, word identification, word attack , passage comprehension, and total test, and at the $p.<.01$ level of confidence for word comprehension on the Woodcock Reading Mastery Tests, with results favoring the 1984 group (see Table 1).

Insert Table 1 About Here

Because the word attack subtest of the WRMT requires the student to read nonsense words, it relates most closely to the decoding and encoding demands of phoneme segmentation and blending. Therefore, the relative mastery scores of that subtest were closely examined. The relative mastery scale of the WRMT is an equal interval scale that directly reflects changes in an individual's proficiency with a task. These scores showed no significant differences between the entry scores of groups entering first grade during the six years between 1974 and 1983 that the WRMT were administered. Those Fall scores ranged from 50.78 to 54.44. The entry scores of the 1984 first graders (who had ADD training in kindergarten) was 81.90, showing the strong effect of the ADD program on word attack skills as measured by that subtest of the WRMT (see Table 2).

Insert Table 2 About Here

Summary

This study indicated that kindergarten students in Arco, Idaho who received training in identifying the oral-motor characteristics of phonemes as outlined in the Auditory Discrimination in Depth Program, and who used that awareness to complete segmentation and blending tasks , entered first grade with better reading skills than students who did not receive such training in kindergarten. The students' ability to read nonsense syllables, as measured by the Woodcock

Reading Mastery Tests, were especially strong. Since the approach had already proven its worth for use in first grade in the same district, the extension to the kindergarten curriculum demonstrated the value of training students to become aware of the oral-motor characteristics of phonemes and to use that awareness to identify the sequence of sounds within syllables prior to the time the students are asked to read and spell with an alphabetic code.

Table 1. Means, standard deviations, t values, and probability levels of raw score data comparing the entry scores into first grade of students who did not have ADD training in the Arco kindergarten during 1982-83 with Arco students who did have ADD training in kindergarten in 1983-84.

	X 1983	X 1984	s.d. 83	s.d. 84	t value	p val
Letter Iden.	24.49	30.89	8.69	3.35	4.74	<.001
Word Iden.	4.83	20.40	9.36	20.14	5.08	<.001
Word Attack	1.85	10.34	3.37	8.55	6.67	<.001
Word Compre.	.55	3.34	2.28	5.58	3.34	<.01
Passage Compre.	1.08	7.0	3.02	7.03	5.59	<.001
Total Test	32.79	72.06	21.16	41.32	6.08	<.001

Table 2. Pretest and Posttest Means and standard deviations of the relative mastery scores on the Word Attack Subtest of the Woodcock Reading Mastery Tests for first grade students who received ADD Program training in first grade only (1974-1984) and first grade students who received ADD Program training in kindergarten and first grade (1984-85).

	Year	#	Pre/Word Attack	s.d.	Post/Word Attack	s.d.
ADD in 1st Grade Only	74-75	20	51.14	2.80	94.13	2.95
	75-76	20	50.78	2.50	97.78	2.91
	77-78	24	53.46	2.27	104.08	2.65
	78-79	24	53.83	2.49	100.59	2.91
	79-80	26	52.22	2.29	104.53	2.67
	83-84	50	54.44	1.59	106.91	1.86
ADD in K & 1st Grade	84-85	23	81.90	2.43	115.03	2.84

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